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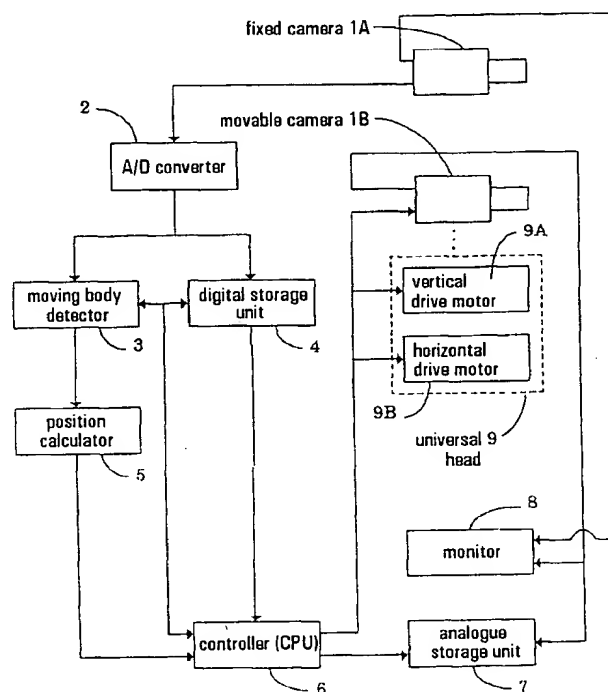
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Title Security System

Abstract

OBJECT: To provide a security system wherein a television camera for monitoring purposes is installed in a location, such as a bank or a factory, where it is considered essential to prevent theft or ensure safety, so that while detecting a moving body on the basis of the video signal transmitted from this camera, the moving body can be tracked and monitored.

CONSTITUTION: A security system characterised in that it comprises a fixed, wide-angle first camera means (1A) for covering an entire monitoring area, a second camera means (1B) having a zoom function and which is fixed to a universal head (9), and a control means (6) for driving and controlling this universal head; wherein the second camera means and the universal head are driven and controlled on the basis of commands from the control means that are based on information from the first camera means.



Claim

1. A security system characterised in that it comprises:

a fixed, wide-angle first camera means for covering an entire prescribed monitoring area;

a second camera means having a zoom function and which is fixed to a universal head; and

a control means for driving and controlling said universal head;

wherein said second camera means and said universal head are driven and controlled on the basis of commands from said control means, these commands being based on information from said first camera means.

Detailed Description of the Invention

Industrial field of utilisation

(1) This invention relates to security systems. More particularly, it relates to security systems wherein a television camera for monitoring purposes has been installed in a

location, such as a bank or a factory, where it is considered essential to prevent theft or ensure safety, so that while detecting a moving body on the basis of the video signal transmitted from this television camera, the moving body can be tracked and monitored.*

5 Prior art

(2) A method that has been adopted in a conventional security system of this type is to fixedly set up a single television camera for monitoring purposes on a suitable universal head, and to drive and control this universal head in horizontal and vertical directions as required on the basis of information relating to the video signal transmitted from the television camera.

(3) When a control method of this kind is used and a moving body of a prescribed type has been detected, the universal head on which the television camera is fixed is driven under control, and one or other of the following processing techniques is usually carried out. Namely: either (1) two screen views separated by a certain prescribed time interval are fetched and the difference between the images in these screen views is found; or (2) the screen image at a certain prescribed point in time is subjected to the data processing and computation required to generate a virtual screen image, whereupon the difference between this virtual image and the image obtained after the universal head has been driven under control, is found. However, if processing technique (1) is employed, it is necessary to fetch two screen images in order to obtain a difference, and to this extent considerable loss of time cannot be avoided. If technique (2) is employed, then because a virtual screen image has to be generated, there are restrictions on the angle to which the universal head is driven. Moreover, considerable time is required for the computation that generates the virtual screen image.

Problems which the invention will solve

(4) Problems of the sort described above have been encountered in conventional technology of this type. That is to say, problems encountered have included the following:

(A) In the case of the method wherein two screen views separated by a certain prescribed time interval are fetched and the difference between the images in these screen views is found, considerable time is required to fetch the images corresponding to the two screen views, and to this extent a considerable loss of time is involved.

(B) In the case of the method of generating a virtual screen image by means of data processing and computation based on the screen image at a certain prescribed point in time, and then finding the difference between this virtual image and the image obtained after the universal head has been driven under control, there is a limit to the angle at which the universal head is driven when generating the virtual screen image, and considerable time is required for the computation that generates this virtual screen image.

(5) The present invention has been devised to overcome the problems described above. It is an object of the invention to provide a security system that is capable of rapidly and accurately monitoring and detecting a moving body by providing a first

* Numbers in round brackets at the beginning of paragraphs correspond to the paragraph numbering in the Japanese patent document.

camera means for monitoring the entirety of a certain prescribed monitoring field, and a second camera means capable of detailed monitoring of a portion of this field that is of greater interest.

Means for solving problems

- 5 (6) The security system of this invention has been devised to achieve the above-mentioned object, and is characterised in that it comprises a fixed, wide-angle first camera means (1A) for covering an entire prescribed monitoring area, a second camera means (1B) having a zoom function and which is fixed to a universal head (9), and a control means (6) for driving and controlling the universal head; wherein
10 the second camera means and the universal head are driven and controlled on the basis of commands from the control means, these commands being based on information from the first camera means.

Working of the invention

- 15 (7) To realise the characteristics described above, the security system of this invention operates as follows. Namely, if a body exhibiting abnormal behaviour is detected on the basis of the image from the wide-angle first camera means, information based on the detection of this abnormal body is used to calculate the position and size of the body. The second camera means having a zoom function and the universal head are then driven and controlled on the basis of this result. In this
20 way, a particular portion of a moving body which is of interest as an abnormality, is always kept in the centre of the field of view of the second camera means.

Embodiment

- (8) FIG. 1 is a schematic block diagram of the security system according to an embodiment of this invention. In FIG. 1, fixed camera 1A serving as the first camera means is capable of monitoring over a wide-angle field of view, and is installed fixedly
25 in a position from which it can see an entire field of view that requires monitoring, this being a location, such as a bank or a factory, where it is considered essential to prevent theft or ensure safety. Movable camera 1B serving as the second camera means is provided with a zoom function which enables it to narrow its field of view so that it can monitor and detect a particular object. This movable camera 1B is driven and controlled in vertical and horizontal directions by means of universal head 9 to be described hereinafter. A/D converter 2 serves to convert the analogue image signal transmitted from fixed camera 1A to a corresponding digital signal. Moving body
30 detector 3 receives the digital signal from this A/D converter 2 and on this basis detects the presence of a moving body. Digital memory 4 is conveniently a conventional means such as a RAM type semiconductor memory device, and receives the digital signal from A/D converter 2 and stores the required signal, which contains a signal corresponding to the presence of a moving body. Position calculator 5 serves to calculate, on the basis of the signal from moving body detector 3, the position at
35 which the moving body in question is present. Note that this position calculator 5 may alternatively constitute a portion of controller (CPU) 6 to be described hereinafter. Controller (CPU) 6 comprises suitable microprocessors and so forth, and issues required commands and signals to moving body detector 3 and digital memory 4 on the basis of various signals from digital memory 4 and position calculator 5. Controller
40 (CPU) 6 also outputs required commands and signals to movable camera 1B, vertical

drive motor 9A and horizontal drive motor 9B in universal head 9, and to analogue storage unit 7. Analogue storage unit 7 serves to store analogue image signals indicative of the presence of a moving body of interest, and is for example a VTR device. Analogue storage unit 7 is adapted to store required portions of the analogue image signal transmitted from movable camera 1B under the control of controller (CPU) 6 mentioned above. Monitor 8 is conveniently a display means equipped with a display screen such as a CRT or a liquid crystal display. On monitor 8 are displayed, in a manner depicted in FIG. 2 to be described hereinafter, the analogue image signal relating to the entire monitoring area, this signal being transmitted from aforementioned fixed camera 1A, and the analogue image signal with the localised field of view, this signal being transmitted from movable camera 1B. Universal head 9 serves to securely mount movable camera 1B and is adapted so that movable camera 1B can be moved to any desired orientation by means of vertical drive motor 9A and horizontal drive motor 9B contained in the universal head.

(9) FIG. 2 is an exemplary view of the display screen in the aforementioned embodiment. In FIG. 2, full screen 20 displays an image signal corresponding to the full field of view monitored by fixed camera 1A. The full screen of a television picture tube is for example used as monitor 8. As opposed to this, attention screen 21 (which is zoomable) displays an image signal corresponding to a portion to which particular attention is to be paid. For example, if, in the full field of view being monitored by aforementioned fixed camera 1A, a body moving at a velocity exceeding a certain prescribed permissible limit is detected, attention screen 21 is centred on this body and zoomed as required, whereby the image of the body in question is made sufficiently large to become identifiable. Image information relating to a body that has been identified in this manner can be stored in analogue storage unit 7 as required, and this can provide material for subsequent detailed examination.

Effect of the invention

(10) As has been described above, the security system of this invention is characterised in that it comprises a fixed, wide-angle first camera means (1A) for covering an entire monitoring area, a second camera means (1B) having a zoom function and which is fixed to a universal head (9), and a control means (6) for driving and controlling the universal head; wherein the second camera means and the universal head are driven and controlled on the basis of commands from the control means, these commands being based on information from the first camera means. That is to say, having been provided with these characteristics, this invention can easily and reliably perform required monitoring and recording relating to a body moving at a higher speed, by using two camera means having different functions (a fixed, wide-angle first camera means for covering the entire monitoring area and a movable second camera means having a zoom function).

Brief Description of the Drawings

FIG. 1 is a schematic block diagram of a security system according to an embodiment of this invention.

FIG. 2 is an exemplary view of the display screen in this embodiment.

Key to referencing numerals

1A...fixed camera; 1B...movable camera; 2...A/D converter; 3...moving body detector; 4...digital memory; 5...position calculator; 6...controller (CPU); 7...analogue storage unit; 8...monitor; 9...universal head; 9A...vertical drive motor; 9B...horizontal drive motor

FIG. 1

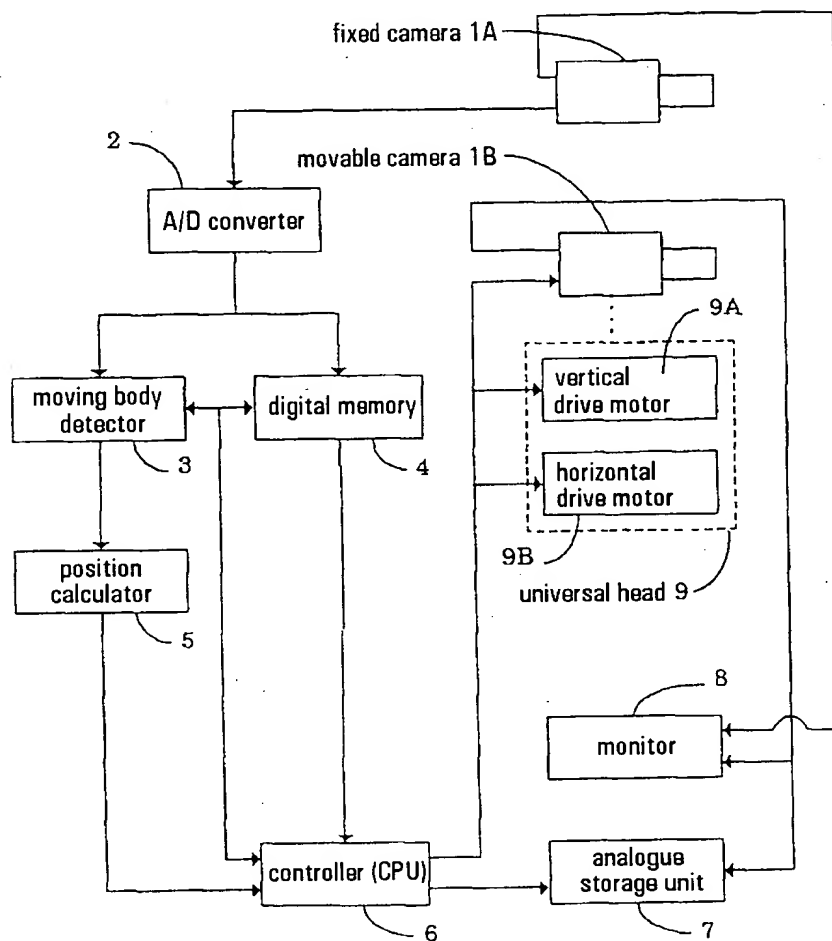


FIG. 2

